

WHAT IS CLAIMED IS:

1. A method for measuring characteristics of a film disposed on a substrate, said method comprising:  
identifying a plurality of processing regions on said film;  
measuring characteristics of a subset of said plurality of processing regions, defining measured characteristics;  
determining a variation of one of said measured characteristics; and  
associating a cause of said variations based upon a comparison of said one of said measured characteristics to measured characteristics associated with the remaining processing regions of said subset.
2. The method as recited in claim 1 wherein said variation is a defect.
3. The method as recited in claim 1 wherein said variation is an alignment error.
4. The method as recited in claim 1 wherein said variation is a critical dimension variation.
5. The method as recited in claim 1 wherein said cause is selected from a set of causes as an imprint head defect, a support stack defect, a template defect and a substrate defect.
6. The method as recited in claim 1 wherein measuring further includes obtaining a predetermined number of measurements in one of said plurality of processing regions and quantizing said predetermined number of measurements and obtaining a mean value and,

with determining said variation further including comparing said mean value with a predetermined threshold.

7. The method as recited in claim 1 wherein measuring further includes obtaining a predetermined number of measurements in one of said plurality of processing regions and quantizing said predetermined number of measurements and obtaining a mean value and a standard deviation from said mean value, with determining said variation further including comparing said standard deviation with a predetermined threshold.

8. The method as recited in claim 1 wherein associating further includes ascertaining an additional variation in remaining processing regions of said subset having features common to said variation and associating said cause with one of a template defect and an imprint head defect.

9. The method as recited in claim 1 wherein associating further includes finding an absence of similarities between said variation and characteristics of the remaining processing regions of said subset and associating said cause with one of a support stack defect and a substrate defect.

10. The method as recited in claim 1 wherein measuring further includes impinging optical radiation upon said plurality of processing regions and sensing optical radiation reflecting from said film containing information corresponding to said characteristics.

11. A method for measuring characteristics of a film disposed on a substrate, said method comprising:

identifying a plurality of processing regions on said film;

measuring characteristics of a subset of said plurality of processing regions, defining measured characteristics,

obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics;

determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold; and

associating a cause of said variations based upon a comparison of said one of said measured characteristics to measured characteristics associated with the remaining processing regions of said subset.

12. The method as recited in claim 11 wherein said cause is selected from a set of causes consisting of an imprint head defect, a support stack defect, a template defect and a substrate defect.

13. The method as recited in claim 11 wherein said cause is selected from a set of causes consisting of an alignment error and a critical dimension variation.

14. The method as recited in claim 12 wherein associating further includes ascertaining an additional variation in remaining processing regions of said subset having features common to said variation and associating said cause with one of said template defect and said imprint head defect.

15. The method as recited in claim 12 wherein associating further includes finding an absence of similarities between said variation and characteristics

of the remaining processing regions of said subset and associating said cause with one of said substrate defect and said support stack defect.

16. A method for measuring characteristics of a film disposed on a substrate, said method comprising:

identifying a plurality of processing regions on said film;

measuring characteristics of a subset of said plurality of processing regions, defining measured characteristics;

determining an anomaly among said measured characteristics; and

associating a source of said anomaly based upon a comparison of said anomaly in said measured characteristics with characteristics in the remaining of said processing regions.

17. The method as recited in claim 16 wherein said source is selected from a set of causes such as an imprint head defect, a support stack defect, a template defect and a substrate defect.

18. The method as recited in claim 17 wherein measuring further includes obtaining a predetermined number of measurements in one of said plurality of processing regions and quantizing said predetermined number of measurements and obtaining a mean value and comparing said mean value with a predetermined threshold.

19. The method as recited in claim 17 wherein measuring further includes obtaining a predetermined number of measurements in one of said plurality of processing regions and quantizing said predetermined number of measurements and obtaining a mean value and a

standard deviation from said mean value and comparing said standard deviation with a predetermined threshold.

20. The method as recited in claim 19 wherein associating further includes ascertaining an additional defect in the remaining processing regions of said subset having features common to said defect and associating said cause with one of said imprint head defect and said template defect.

21. The method as recited in claim 19 wherein associating further includes finding an absence of similarities between said defect and said additional defect in the remaining processing regions of said subset and associating said cause with one of said support stack defect and said substrate defect.

22. The method as recited in claim 19 wherein measuring further includes impinging optical radiation upon said plurality of processing regions and sensing optical radiation film containing information corresponding to said characteristics.

23. A system for measuring characteristics of a film disposed on a substrate, said system comprising:

- a substrate support stack;
- a substrate disposed on said substrate support stack;
- an imprint head;
- a template disposed on said imprint head;
- a sensing system; and
- a means for identifying a plurality of processing regions, a subset of which has characteristics associated therewith, and ascertaining a cause of an anomaly in characteristics of one of said plurality of

processing regions by comparing of the characteristics of said one of said plurality of processing regions with characteristics associated with the remaining processing regions of said subset.

24. The system as recited in claim 23 further including a source of radiation to direct radiation along a path toward said support stack, with said template being disposed within said path and being transparent to said radiation.

25. The system as recited in claim 23 wherein said means for identifying further includes a processor and a memory device storing code to be operated on said processor, with said code including a first subroutine to control said sensing device to impinge optical radiation on the plurality of processing region of said subset and detect optical radiation reflected therefrom.

26. The system as recited in claim 25 wherein said cause is selected from a set of causes such as an imprint head defect, a support stack defect, a template defect and a substrate defect.

27. The system as recited in claim 25 said code further includes a second subroutine to control the operations of said sensing device to obtain a predetermined number of measurements in said one of said plurality of processing regions and quantizing said predetermined number of measurements to obtain a mean value, with said first subroutine determining said variation by comparing said mean value with a predetermined threshold.

28. The system as recited in claim 25 said code further includes a second subroutine to control the operations of said sensing device to obtain a predetermined number of measurements in said one of said plurality of processing regions and quantizing said predetermined number of measurements to obtain a mean value and a standard deviation from said mean value, with said first subroutine determining said variation by comparing said standard deviation value with a predetermined threshold.